



US DEPARTMENT OF DEFENSE

## **BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE**

### **Mechanisms of Injury**

#### **Connecting Combat-related mTBI with Posttraumatic Stress Disorder Symptoms through Brain Imaging**

USUHS CNRM is sponsoring and conducting research to enhance understanding of the relationship between findings on structural and functional brain imaging and symptoms of PTSD. Researchers conducted a nested case-control analysis among a cohort of Service Members who did not meet criteria for PTSD but were willing to complete a comprehensive assessment within two months of returning from combat deployment. Data collection included DTI to assess injury-related white matter structural differences, resting state functional MRI (fMRI) to assess functional connectivity changes, and a range of psychological measures, including the Clinician-Administered PTSD Scale to assess PTSD symptoms. Data from these assessments were compared between Service Members with combat-related mTBI and age- and gender-matched controls. Individuals with mTBI had more degraded white matter integrity, a positive correlation between the white matter microstructure and default mode network (DMN) connectivity, and higher subthreshold PTSD symptoms than controls. Researchers have postulated that mTBI-related white matter structural changes that disrupt function of the DMN may influence the coordination of large scale brain networks during goal directed behavior, which could reinforce PTSD symptoms. These findings support this potential mechanism through which mTBI may alter brain function, and in turn, contribute to PTSD symptoms, and may ultimately enable distinction between symptoms presented by mTBI and PTSD.